Council for Agricultural Science and Technology
Kent G. Schescke
Executive Vice President
2017
CAST, through its network of experts, assembles, interprets, and communicates credible, balanced, science-based information to policymakers, the media, the private sector, and the public.

“...what CAST does is very important to mankind.”
~Dr. Norman E. Borlaug

The Science Source for Food, Agricultural, and Environmental Issues
What Does CAST Do?

• CAST disseminates science-based information through:
  o Print materials
  o Online sources
  o Videos on website, YouTube, and SchoolTube
  o Spanish and Chinese translations on select publications
How Does CAST Do This?

With the help of many volunteer contributors:

• **50 Board Members** representing scientific societies, companies, nonprofits, and universities

• **70+ active task force members** working on CAST reports yet to be released

• **Volunteer scientific experts as authors and reviewers**—more than **350 volunteers** since 2007

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<td>Academia</td>
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Primary CAST Objectives

- Publishing task force reports, commentaries, and issue papers written and peer reviewed by scientists from many disciplines

- Distributing CAST publications widely to nonscientists to enhance the education and understanding of the general public
Ag quickCASTs

- 1 page with live links to content in original documents
- Available free on CAST website
- Printable for distribution as handouts

The Science Source for Food, Agricultural, and Environmental Issues
The Need for Agricultural Innovation to Sustainably Feed the World by 2050:

“How will we feed nine+ billion people?”

CAST is creating a series that looks at specific programs, policies, and technologies that will advance global food security. Goals include the following:

• Focus on the role of agriculture/food science and technology to close the expected productivity gap.

• Spur interests in research funding and highlight societal benefits of new and emerging technologies.

• Encourage the implementation and use of science-based regulation to support innovation and the advancement of agriculture/food technology.
Other Forthcoming Publications

• Crop Protection Contributions toward Agricultural Productivity (Ag Innovation Series)

• Why Does Bee Health Matter? The Science Surrounding Honey Bee Health Concerns and What We Can Do About It

• Omega-3 Fatty Acids: Health Benefits and Dietary Recommendations

• Genome Editing in Agriculture—Methods, Applications, and Governance (Ag Innovation Series)
Friday Notes

- Published 48 times annually
- Lead articles on timely ag topics
- Dozens of ag news briefs from 100+ sources with live links to original articles
- An international news section
- Legislative updates from D.C.
Visit CAST Online
www.cast-science.org

Free access to CAST material for individuals with a “.gov” address

The CAST website has had visitors from every U.S. state and 181 countries.
Learn more about CAST at www.cast-science.org.

Sun...Earth...Water...Mankind.
In synergy with science and technology to create a sustainable world supported by plants and animals.
Presented by

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March 22, 2017
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In the 1970s, we had the Green Revolution, which saved 1 billion people from starvation and gave the world 30 to 35 years of food security. Now we need a second Green Revolution for the next 35 years. It is the 9,000,000,000 people question.
Give Us This Day Our Daily Bread: The World of Agriculture

Few scientists think of agriculture as the chief, or model, science. Many indeed, do not consider it a science at all. Yet, it was the first science that makes all human life possible; and it may well be that before the century is over, the success or failure of science as a whole will be judged by the success or failure of agriculture.

Jean and Andre Mayer (1974)
How Plant Breeding Works

- Defining the traits that need to be improved
- Identifying germplasm (parents) with the needed traits and genes to improve cultivars
- Crossing/intermating the chosen parents (variation)
- Genetic segregation and selecting the outstanding progeny of the crosses (repeated for several generations)
- Field testing of the selections to determine if they warrant release as a new variety

We use all of our tools: DNA sequencing, genomics, phenomics, statistics, bioinformatics, computing power, modeling, engineering, agronomy, plant pathology, entomology, nutrition/health, flavor/quality chemistry, landscape systems.
Our Targets

- Food, Nutrition, and Health
- Fiber
- Fuel and the Biobased Economy
- Shelter
- New Knowledge

www.keywordsking.com
USDA photo gallery, Wheat Foods Council
The Energy Collective
The Framework Within Which Plant Breeding Works:

- We create new science and apply it.  
  *No, a thousand times no; there does not exist a category of science to which one can give the name applied science. There are science and the applications of science, bound together as the fruit to the tree which bears it.*  
  *Louis Pasteur*

- We educate the next generation of plant breeders.
- We work within government policies and regulations.
- We span all research sectors (public, private, non-governmental, international) and a huge diversity of crops.
Innovation is driven by people.

We must continue to attract the best and the brightest for our industry and for food security and the biobased economy while enhancing our land.

Experiential learning is both vital and critical (learning by doing).
The Role of Sound Policies

Plant breeding, like any other science, needs to have policies that allow it to flourish.

- 1810: American Foreign Officers were instructed to collect seeds and plants of economic potential.
- 1862: The Morrill Act formed the land-grant universities.
- 1970: Plant Breeders Rights and the Plant Variety Protection Act enhanced private sector research to develop improved crops.
- Ongoing: Genetic engineering, gene editing, ...
"acquire and preserve.... information concerning agriculture which can be obtained by means of books and correspondence, and by practical and scientific experiments"

The Morrill Act:

"An Act for donating public lands to the several states and territories which may provide colleges for the benefit of Agriculture and Mechanic Arts"

This was the first federal act to support higher education.
Plant breeding is of huge commercial importance, and multibillion-dollar companies are involved.
The public sector research at universities, international centers, foundations, and nongovernmental organizations is also a multibillion-dollar enterprise.
How we work together (mesh our research agendas) for the public good (in its broadest definition) is critical.
Plant breeding is a core and vital capacity for the USA.
Partnerships are necessary and desirable for delivering experiential education.
The Three Joys of Plant Breeding

The cross

The selection

The impact
“... a good past is positively dangerous if it makes us content with the present and unprepared for the future.”

Charles Eliot

Plant breeding moving forward
Innovation in Agricultural Plant Breeding and Genetics Generates Wealth

- Prepares a tech-savvy 21st century workforce
- Creates businesses, jobs
- Increases discretionary income (keeps the cost of food low)

https://www.entrepreneur.com/slideshow/290029
http://www.biotech.wisc.edu/services/dnaseq
http://ltm.agriculture.purdue.edu/default_ltm.htm
http://news.illinois.edu/blog/view/6367/233653
Agriculture Is a Key User and Developer of Technology

- Create readiness; avert/deter impacts of climate change.
- Expand energy options.
- Reduce the carbon-footprint of agriculture.
- Leverage investments in other scientific advancements.

Monsanto’s 8th Whistle Stop Investor Field Tour, August 17-18, 2016
Innovation in Plant Breeding Supports a Healthy Population

- Dietary diversity and nutritious food
- Proactive approach to health
- Spice of life!

Every dollar invested in agricultural research creates $20 in economic activity, according to the USDA.
Sound, Effective, Science-based Policies and Regulations Provide a Framework for Innovation and Lasting Impacts

- Empower innovation
- Protect assets and enhance investments
- Ensure safety
- Support global agricultural markets

http://spselca.org/index.php/2016/11/22/we-are-stewards/

Recommendations:

- High prioritization of federal funding for public research
- Coordination with private sector
- Coordination of the USDA, NSF, Foundation for Food and Agriculture Research (FFAR), USAID
- Freedom to explore, discover, provide solutions
- Guidelines and policies that foster plant breeding and its outcomes—needs to be global
Feeding the masses in years ahead...
Never Forget the Urgency...

So many are counting on us
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For a free download of Issue Paper 57, visit the CAST website: www.cast-science.org.